Missouri Department of Natural Resources

Total Maximum Daily Load Information Sheet

Red Oak Creek and Tributary to Red Oak Creek

Water Body Segment at a Glance:

County: Gasconade
Nearby Cities: Owensville
Length of impaired segment
Trib. to Red Oak Creek:
WBID 3360: 0.5 mile
WBID 3361: 1.5 miles
Red Oak Creek: WBID 2038: 9 miles
Impairment within segment 2038: 2 miles
Pollutant: Low Dissolved Oxygen
Source: Owensville Wastewater Treatment Plant (WWTP) and Nonpoint Source (WBID 3361 only)


State map showing location of watershed

Scheduled for TMDL development: 2016

Prior TMDL: A permit-in-lieu of TMDL addressing organic sediment was approved by EPA 2006

Description of the Problem

Designated beneficial uses of Red Oak Creek and Tributary to Red Oak Creek

- Livestock and Wildlife Watering
- Protection of Warm Water Aquatic Life
- Protection of Human Health (Fish Consumption)

Use that is impaired

- Protection of Warm Water Aquatic Life

Standards that apply

- In the Missouri water quality standards found in 10 CSR 20-7.031 Table A, the criterion for dissolved oxygen, or DO, in streams is a minimum of 5 mg/L (milligrams per liter or parts per million).

Background information and water quality data

History:
Water quality surveys by the department in 1995 and 1997 found that Red Oak Creek and its tributary had turbid (cloudy) green water due to high concentrations of suspended algae discharged by the

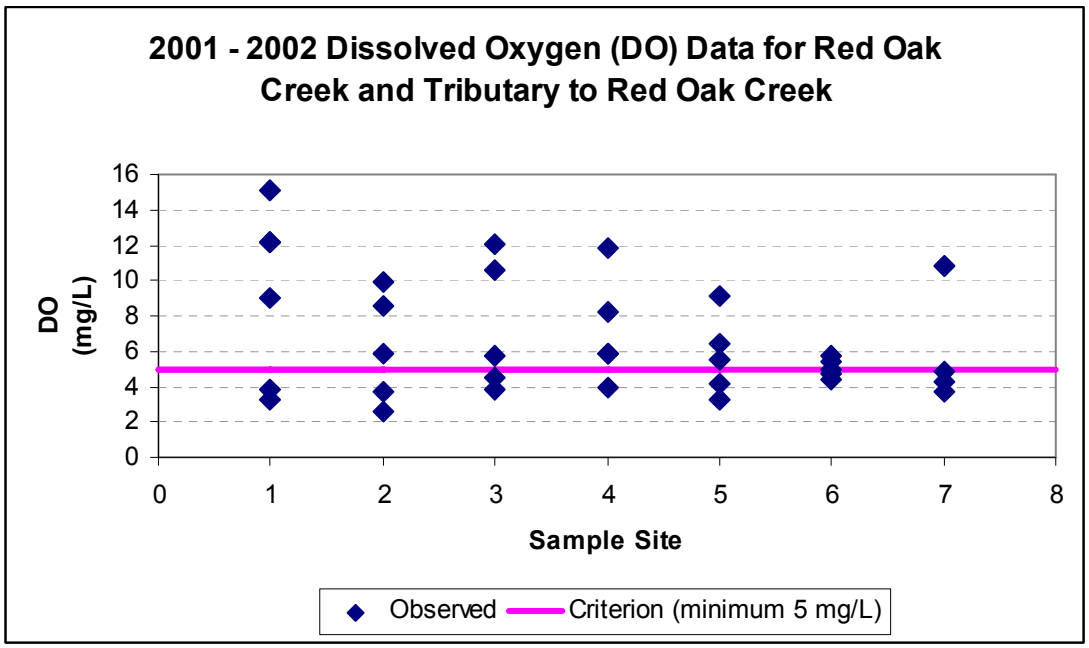
wastewater lagoon of the Owensville Wastewater Treatment Plant, or WWTP. The streams also showed signs of low dissolved oxygen (DO) in the morning during low flow conditions. Organic sediment refers to organic matter, like algae, that settle on the streambed, eliminating habitat for aquatic invertebrate animals (like aquatic insects and crayfish) and smothering fish eggs. This sediment can create an oxygen demand as it is decomposed, resulting in low instream DO levels. In 1997, excessive benthic (attached to the bottom) algal growth was also noted.

A revised permit was issued to Owensville Sept. 30, 2005, based on a planned upgrade to the WWTP. The department submitted this permit-in-lieu of, or PIL, a TMDL to address the organic sediment problem. The PIL was approved by the U.S. Environmental Protection Agency April 21, 2006. The new permit limits went into effect in Sept 2008.

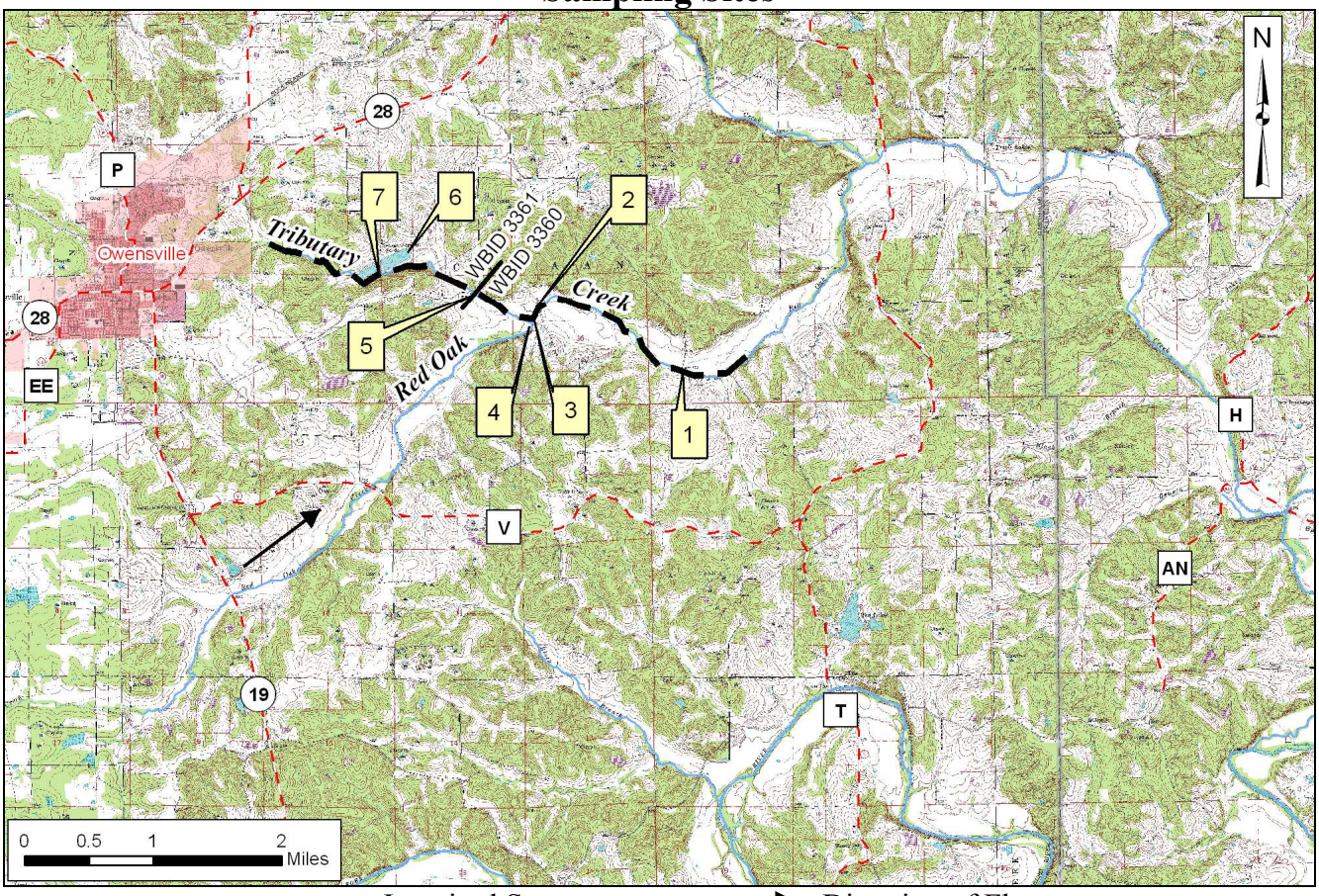
Low dissolved oxygen:

Meanwhile, low dissolved oxygen persists in the streams (see graph below). This is not protective of aquatic life, as many aquatic organisms require high levels of oxygen to survive. For dissolved oxygen, if more that 10 percent of measurements in a water body fail to meet the water quality criterion that water body is judged to be impaired. In the case of Red Oak Creek (Sites 1 and 2), 4 of 11 samples (36.4 percent) did not meet the water quality criterion. In the Tributary to Red Oak Creek (Sites 3, 5 and 7), 7 of 15 samples (46.7 percent) did not meet the water quality criterion. Site #6 is the lagoon itself and does not count toward assessment of instream water quality. Site #4 is upstream of the impaired segment of Red Oak Creek. The WWTP is believed to be causing the low dissolved oxygen impairment in both Red Oak Creek and both segments of the tributary. Nonpoint sources, or general storm water runoff, are believed to add to the low dissolved oxygen problem in the upstream segment of the tributary (WBID 3361).

The department plans to conduct another study on the two streams in 2010-11 to determine the effect of the new upgrade, investigate possible nonpoint sources and calculate a new wasteload allocation for biochemical oxygen demand.



Red Oak Creek and Tributary in Gasconade County, Missouri, with Sampling Sites



Impaired Segment Direction of Flow

Site Index

1 – Red Oak Cr. 1.5 mi DS of confluence with trib
2 – Red Oak Cr. 0.1 mi DS of confluence with trib
3 – Trib to Red Oak Cr. 1.1 mi DS of outfall
4 – Red Oak Cr. 0.1 mi US of confluence with trib
5 – Trib to Red Oak Cr. 0.6 mi DS of outfall
6 – Owensville Lagoon Effluent
7 – Trib to Red Oak Cr. 0.3 mi. US of outfall

For more information call or write:

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